Graz University of Technology
Institute of Rock Mechanics and Tunnelling

Master's Project (MP, 5 ECTS)

Block shape classification with ellipsoid fitting

Description

Recent research has shown the influence of the block shape on the rock mass behaviour under loading conditions. These results lead to a necessity for a sound classification system for rock block shapes. Kalenchuk et al. (2006) proposed such a method, where the block shapes were classified according to their elongation and the ratio of their volume and surface area. In general, the classification distinguishes between elongated, cubic and platy blocks. However, the methodology to identify the elongation of single blocks is rather complicated. Hence, a new approach shall be investigated and tested. The new approach includes the fitting of an ellipsoid into the vertices of the blocks and calculating the ratio between the longest axis and the two shorter axes. The new methodology shall be compared with the already established block shape classification method in terms of accuracy, computation time and robustness.

Methodology

- Literature research on block shape classification systems
- Writing of an Matlab-Code to include the ellipsoid fitting into the block shape classification method using already existing codes
- Writing a technical report with the found results

This project shall contribute to a better determination of the block shapes generated by a joint network which gives a better understanding of the deformation behaviour and global stability of the investigated rock mass.

For the elaboration, sound skills in Matlab programming are necessary.

Templates for the scientific report can be found on the institute's homepage. There is also a guideline for scientific writing free downloadable at the homepage, whose compliance is mandatory. The language for the report can either be in English or in German.

References

[1] Gottsbacher (2017) Calculation of the Young's Modulus for Rock Masses with 3DEC and comparing it with empirical methods, master's thesis, Graz University of Technology.

[2] Kalenchuk et al. (2006) Characterizing block geometry in jointed rockmasses, International Journal of Rock Mechanics and Mining Sciences (43), p. 1212-1225, doi: 10.1016/j.ijrmms.2006.04.004.

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Start by appointment

Duration ca. 125 h

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